

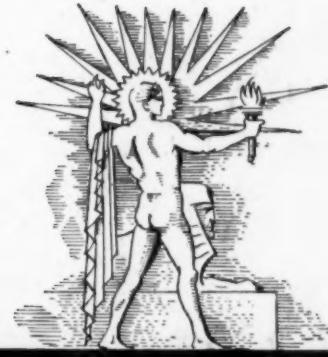
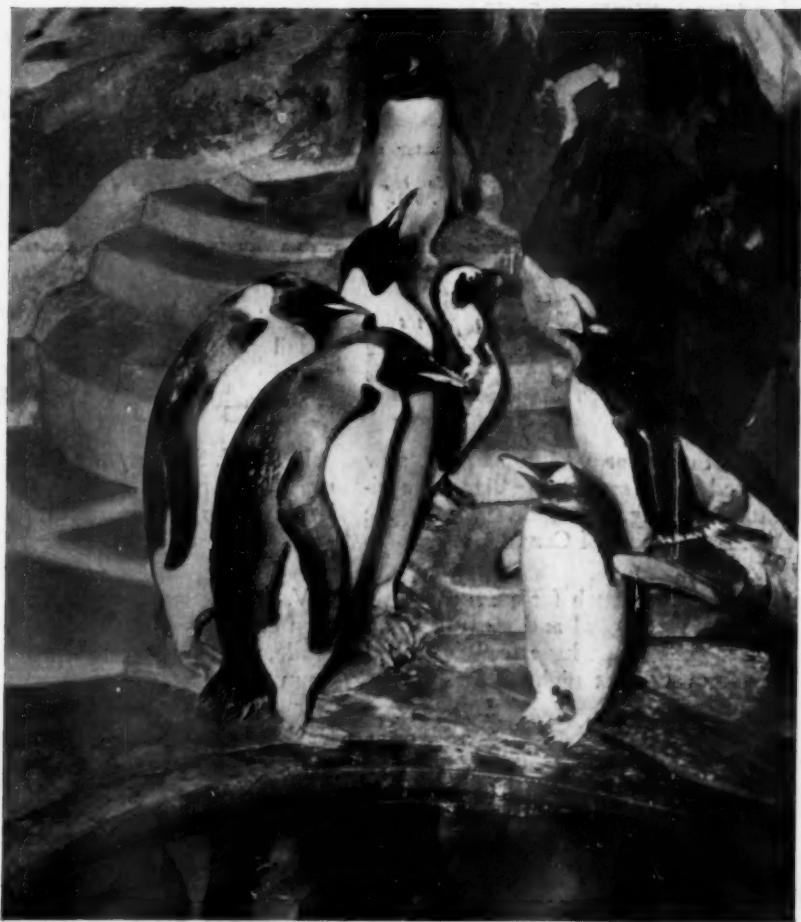
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SCIENCE NEWSLETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



May 17, 1941

Newcomers

See Page 313

A SCIENCE SERVICE PUBLICATION

Do You Know?

The Chinese have used *revolving bookcases* since the ninth century.

One-fourth of all the maple syrup produced goes into flavoring *tobacco*.

Largest *gorilla* in captivity is Mbongo, a 617 pound ape in the San Diego zoo.

About two-thirds of the *fats* and *oils* used in the United States are used as food.

It takes at least five tons of high grade alloy steels to build a big transport *plane* or heavy *bomber*.

Arabs in the Middle Ages explained *tides* by saying that the moon heated the ocean, causing the water to swell and rise.

The United States' yearly needs of *rubber* have increased from one pound to 10.5 pounds per person in the past 30 years.

Most profusely blooming *flower* of the field in Biblical Palestine, says a botanist, was probably the poppy anemone, scarlet, blue, gold, and white.

A species of *turkey* that existed in Mexico 50,000 years ago recently was detected by finding foot and leg bones of the unknown bird.

Deodorizing the lion house has been achieved at the New York Zoo by chemicals which evaporate, giving out a fragrance which masks the animal odors.

SCIENCE NEWS LETTER

Vol. 39 MAY 17, 1941 No. 20

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

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Cable address: Scienservc, Washington. Entered as second class matter at the post-

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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ANTHROPOLOGY

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ARCHAEOLOGY

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CHEMISTRY

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PSYCHOLOGY

How is it likely that the Army may use ink blots in selecting personnel? p. 318.

How should psychology students prepare to be of service to the nation? p. 318.

What has electricity to do with the way you see? p. 317.

PSYCHOLOGY-PHYSIOLOGY

What happens when you inhale the fumes of toluene? p. 307.

Some highly prized *garden plants* of Europe, such as devil's paintbrush, have run wild in America, ruining thousands of acres of land.

More than 2,000,000 foreigners are now reported to be *employed* in German agriculture, mining, and industry, says the U. S. Department of Commerce.

Chicks that scratch for a living with a mother hen get tired and rest often, but brooder chicks that have feed furnished are apt to stray at night and otherwise get into mischief.

Making *plastics* from coffee beans, Brazil plans also to recover coffee oil useful in soaps, medicines, shoe polish and other products.

In the U. S. Army *Air Corps*; a squadron corresponds to a ground force battalion, a group to a regiment, and a wing to an Army brigade.

Valuable prehistoric *pottery* from Indian cliff dwellings in Mesa Verde, Colorado, which has been in a Finnish museum for 50 years, has thus far escaped war damage, according to recent reports.

office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER, at \$3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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MEDICINE

Heparin Used to Prevent Adhesions After Operations

Anti-Blood Clotting Substance From Lungs of Cows Used Successfully In a Few Human Cases as Preventive

ONE OF the greatest unsolved problems facing surgeons in their life-saving operations, the formation of peritoneal adhesions after operations inside the abdomen, may soon be conquered. Promising results in prevention of adhesions by heparin, the anti-blood clotting substance obtained from cows' lungs, were reported by Dr. Floyd Boys, assistant professor of surgery at the University of Virginia Medical School, at the meeting of the Virginia Academy of Science in Richmond.

Peritoneal adhesions, Dr. Boys pointed out, are one of the chief causes of the dangerous condition, intestinal obstruction. They result from the organization of an inflammatory exudate or juice lying between opposed injured surfaces of the peritoneum, which is the membrane lining the inside of the abdominal walls.

"At first the exudate is unclotted," Dr. Boys explained, "but it soon becomes co-

agulated and an adhesion composed of fibrin is formed. If, and when, the opposing peritoneal layers covering the organs in this zone are destroyed by inflammation, the exposed sub-peritoneal connective tissue and blood vessel elements are stimulated to proliferate (grow) over the fibrin which acts as a scaffolding. By this process, termed organization, the fibrinous adhesion is replaced by scar tissue and a permanent adhesion remains."

Between one and two of every 100 major abdominal operations, it is estimated, are performed for relief of intestinal obstruction due to such adhesions.

Many methods have been tried to prevent these adhesions during the 150 years since the condition has been known. None, however, proved satisfactory. When purified heparin was developed for prevention of dangerous clots within blood vessels, Dr. Boys and Dr. Edwin P. Lehman, professor of surgery at the

University of Virginia, believed it might prevent adhesions also by preventing the coagulation of the inflammatory peritoneal exudate which is the starting point of adhesion formation.

Studies on rabbits and dogs were so promising that the heparin treatment for prevention of adhesions was used in a "few cases of intestinal obstruction" in humans "without any untoward effects." Chief danger in the use of heparin lies in the possibility of hemorrhage within the abdomen but care during the operation to prevent bleeding from the small veins and arteries should eliminate this danger, Dr. Boys indicated.

"An enormous number of cases must be treated with heparin before a sufficient number of cases will come to re-operation or post-mortem to offer a basis for judging the efficiency of the method employed," Dr. Boys stated. "It would seem necessary, therefore, that primary acceptance of such a method must rest upon laboratory and animal assay evidence."

"If the experimental value of heparin in preventing peritoneal adhesions is confirmed by other investigators, its use should offer considerable promise for this heretofore essentially unsolved surgical problem."

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PSYCHOLOGY—PHYSIOLOGY

Human Guinea Pigs Test Poisonous Toluene Fumes

FUMES of toluene, chemical from which TNT is manufactured, are being inhaled regularly by three volunteer "human guinea pigs" at the National Institute of Health, to determine just how toxic it is when inhaled. Directing the research are Dr. W. F. von Oettingen, Dr. Paul A. Neal and Dr. D. D. Donohue.

With the rushing of the defense program, more and more toluene is being used in industry. Yet the possible hazards to workmen who are exposed to its fumes have never yet been exactly determined.

It is for this purpose that the three Public Health Service scientists who have volunteered for the experiment go twice a week at nine o'clock in the morning into a specially built gas chamber where they breathe the fumes until noon. After a half-hour luncheon recess, they return to the gas chamber and stay there until five.

Certain concentrations of the fumes are mildly intoxicating. It makes you feel as though you had had a couple of



GAS CHAMBER

In this chamber tests are being carried on to determine the toxicity of toluene. The atmosphere is charged with toluene of a predetermined concentration. In the foreground Dr. D. D. Donahue is preparing the apparatus used to analyze the exhaust air of one of the subjects. In the rear chamber Dr. J. W. Miller is taking a psychomotor test supervised by Dr. E. C. Hammond.

cocktails on an empty stomach. After prolonged inhaling it may cause sleepiness and headache.

Concentrations of the toluene fumes in the gas chamber are varied in different test periods and the men are given a variety of physiological and psychological tests to find out just what effect there is on vision, speed of movement, coordination, as well as breathing, heart rate, circulation, and body chemistry, particularly for traces of toluene in the blood. The effect on white and red blood cells is watched.

Later, concentrations in the test chamber known to produce certain degrees of intoxication or poisoning will be compared with the concentrations actually found in industry.

It is hoped through these human experiments and others now being conducted on animals to discover some simple physical examination to detect toluene poisoning in the earliest stages before it has done permanent damage to the body's organs.

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CHEMISTRY

Charred Documents Made Readable by Chemical

CHLORAL HYDRATE, ingredient of "knockout drops" with which criminals used to drug their victims, now serves in the revival of documents "knocked out" by fire.

Two research workers in the Metropolitan Police Laboratory of London, W. D. Taylor and Henry J. Walls, give a brief description of their method for treating charred documents to restore their legibility. (*Nature*, April 5).

The blackened pages are covered with a 25% solution of chloral hydrate in alcohol, then dried at 140 degrees Fahrenheit. This is repeated several times, until a mass of chloral hydrate crystals appears on the surface. A final treatment is given with a similar solution to which 10% of glycerin has been added. After drying, the document is ready to be photographed.

The method works equally well with printed and typewritten matter, the two scientists state, and reading matter on both sides of the page is restored.

No chemical or physical explanation has yet been found for the process, but investigations on its basis are going forward, with the hope of further improvements. It has been found especially valuable in the restoration of the many documents charred in fires following Nazi incendiary raids.

Science News Letter, May 17, 1941



PSYCHOMOTOR TEST

Dr. E. C. Hammond (right), is testing the ability of P. J. Valaer, chemist at the National Institute of Health to perform certain tests after inhaling toluene. The test is to place the pencil alternately in the two holes in the block as rapidly as possible.

PSYCHIATRY

Mental Disease May Be Banished by Frozen Sleep

FOUR OUT OF TEN PATIENTS IMPROVED, WITH ONE DEATH; METHOD CONSIDERED PROMISING ENOUGH FOR FURTHER TESTS

DISPELLING the fog of unreality which clouds the minds of patients sick with schizophrenia, widespread and generally hopeless mental illness, may be possible by means of frozen sleep, the refrigeration treatment originally devised for cancer patients.

Use of this treatment with great improvement in four out of ten schizophrenia patients and significant but transitory improvement in three more was demonstrated by Dr. John H. Talbott and Dr. Kenneth J. Tillotson, of Boston, in an exhibit at the meeting of the American Psychiatric Association.

Altogether 14 patients, most of whom had been confined to a mental hospital for two or more years and had been given other forms of treatment including insulin and metrazol shock, were given the frozen sleep treatment. They were first given a light anesthetic and then placed between cold blankets through which a refrigerant at a temperature of 32 degrees Fahrenheit or lower circulated.

Internal body temperatures as low as 75 degrees Fahrenheit were achieved in the patients. Normal body temperature is 98.6 degrees Fahrenheit. The low temperature was maintained for from 24 to 72 hours. During most of the time internal body temperatures were maintained between 80 and 90 degrees Fahrenheit, which has been found to be a safe working range for continuous hypothermia. Hypothermia, meaning abnormally low temperature, is the name Dr. Talbott gives to the treatment, in preference to such popular names as frozen sleep, refrigeration or hibernation treatment.

Although one death occurred in the group of patients and in some improvement was only transitory, Drs. Talbott and Tillotson concluded that the results of the treatment were sufficiently good to justify its further use in schizophrenia. Their results show, they believe, that during the first years of schizophrenia irreparable damage to the important central nervous system does not occur and if

the course of the treatment can be altered during these important years there may be great hope for recovery.

Effects of the treatment on heart and kidney action were reported in detail by Dr. Talbott at the meeting in Atlantic City on May 5 of the American Society for Clinical Investigation.

One of the most interesting cases described was that of a young medical student who had been admitted to the hospital several years before. She had not talked in more than two years. When her bodily temperature reached 89 degrees Fahrenheit she talked clearly and logically and with insight. When her

temperature reached 93 degrees Fahrenheit her conversation became confused and her speech thick. In describing her Dr. Tillotson said:

"During the four intervening hours she had looked and acted quite normally and could not have been diagnosed as suffering from schizophrenia. Her conduct during the following three months was possibly somewhat better. During the second treatment two months later she duplicated her previous performance. When her temperature reached 88 degrees Fahrenheit she became mentally clear and conversed for nearly four hours with her father."

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PHYSIOLOGY

Cancer Watched In Frog's Eye; New Facts Learned on Spread

Pattern of Growth Seen To Be Influenced Decisively By Surface Forces; In Fluids, Cancer Is Cylindrical

CANCEROUS tissue growing between the pupil of the eye and the curved, transparent front surface can be watched as if through a window, and studied in detail with a microscope, Prof. Bal-

duin Lucké and Dr. Hans G. Schlumberger of the University of Pennsylvania told the American Philosophical Society meeting in Philadelphia. Their investigations have led to new knowledge

of the way cancerous growth spreads.

"Such observations have led to the conclusion that the pattern of cancerous growth is influenced decisively by surface forces," Prof. Lucké stated. "Thus, if the outgrowths from the cancer extend into the cavity of the eye where they are completely surrounded by fluid, and where in consequence interfacial forces are equalized, the resultant form is cylindrical. If, instead, the outgrowths make contact with a firm surface such as the lens, the interfacial relations become such that the edges of the growing tumor are drawn over the lens, forming a spreading membrane. If, however, the proliferating tumor pushes into the clefts of a loose tissue, such as the iris, the invading cells become arranged as spheres or cylinders, again through the operation of surface forces."

It was also possible to study cancer growth through a far wider range of temperature than is possible with higher animals, because the frog is cold-blooded. Growth was observed at temperatures ranging from only a few degrees above freezing to that of a warm summer day. Low temperatures retarded growth, high temperatures speeded it. At low temperatures the outgrowths were short, stubby, solid, whereas the more rapid growth induced by warmth produced long branching outgrowths that tended to become bulged with fluid.

Science News Letter, May 17, 1941

ARCHAEOLOGY

Armageddon Battlefield Figures in Oil War

THE BIBLE'S most famous battlefield, Armageddon, toward which international conflict is drawing, has new significance in the present struggle, for crossing the famous Palestine plain runs a pipeline to carry the Near East's most precious fighting material—oil.

The pipeline, carrying Mosul oil gushing from Baghdad west to the port of Haifa in Palestine, was opened in 1934.

If armies converge on Armageddon, as they did in the World War in 1918, and as they have been doing since at least as far back as 1479 B. C., the fighting will appear different from any battles there before, because never before has this Biblical plain seen mobile tanks in attack at 50 miles an hour. World War tanks moved at a snail's pace. Ancient Assyrians fighting at Armageddon had wheel towers for carrying battering rams or soldiers, rather suggesting forerun-



TEST CHAMBER EXTERIOR

This shows the airtight door of the toluene chamber. The scientists shown are measuring the concentration of gas inside the chamber.

ners of tanks, of a slow-motion variety.

But throughout history until now, horses and foot soldiers have been mainstays of fighting at this field. Egyptian Pharaoh Thutmose III, who fought the first battle or record at Armageddon, against the Syrian Kings, rode in a glittering chariot of electrum, and part of his soldiers' booty was a collection of gold and silver chariots and horses that had belonged to Syrian troops.

Surprise tactics have won many victories at this pass. Pharaoh Thutmose III won by marching quickly north and rushing his troops through the narrow pass, a plan which Allenby used successfully against the Turks over 3,000 years later.

Although the plain has been a battle-ground throughout history, because the pass is a bottleneck controlling the route

between Egypt and the Tigris-Euphrates countries, the fortress has not been maintained since before the time of Christ. Prof. Edward Robinson stood on a mound and looked over wheat fields in the region a century ago, and wondered where the fort-city of Megiddo, or Armageddon, lay. Between the World War and this war, American archaeologists have dug into the mound where Robinson stood, finding twenty layers of ruins, representing the succession of fortified cities that overlooked the plain from about 3500 B. C. to 350 B. C.

The city 20 times rebuilt testifies to Armageddon's numerous battles and other disasters. In later times, Armageddon has seen clashes between Byzantines and Arabs, Crusaders and Moslems, and Napoleon lost near there the battle of Acre.

Science News Letter, May 17, 1941

ARCHAEOLOGY

Letters Purported To Be Correspondence With Christ

Unparalleled Documents Shown to Archaeologists Seem To Be Letter From Sick Syrian Asking Cure, and Reply

A LETTER purporting to be written to Jesus Christ by a sick Syrian ruler, offering Christ a haven from His enemies in exchange for healing, and Christ's own letter of reply!

A copy of this rarely interesting correspondence has come to light in Palestine, among a mass of old papyrus writ-

ings found by the Colt Archaeological Institute of New York.

Given to Prof. Lionel Casson of New York University for study, he read the letters, as he has translated them before the Classical Association of the Atlantic States meeting in Washington.

Among the doubtful, or apocryphal,

writings regarding Christ, this episode has occurred before. Prof. Casson pronounced the new-found manuscript, however, a long version of Christ's supposed letter and in some respects quite unparalleled.

Written on a single sheet of papyrus, almost complete, the new record of the episode dates probably from the seventh century A.D., Prof. Casson concludes.

He translates the letters:

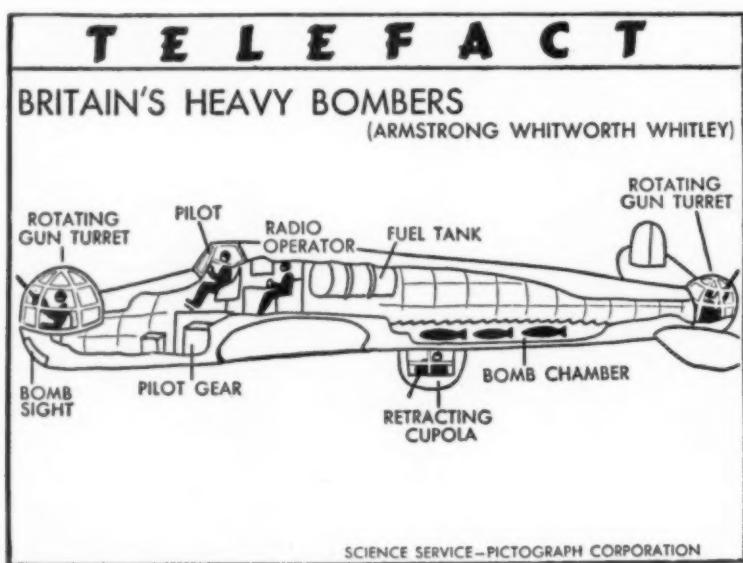
"Abgar, Toparch of the city of Edessa, to Jesus the Benevolent Saviour who has appeared in the city of Jerusalem, greetings.

"I have heard about you and about the cures which you effect without the use of medicines or herbs. For it is said that you cause the blind to see, the lame to walk, that you cleanse lepers and drive out unclean spirits and demons, and that you heal men tortured with chronic diseases and that you raise the dead. When I heard all these reports about you. I made up my mind that one of two things were possible: either as God descended from heaven you are accomplishing these miracles, or as the Son of God. And because of this I am now writing to beg you to come to me and cure me of my disease. For I have also heard that the Jews are muttering against you and want to do you evil. Mine is a very small city, but honored, and it is sufficient for both of us.

"Letter of Jesus Christ, Son of God, to Abgar, Toparch of Edessa.

"You are blessed, and blessed is your city, called Edessa. You are blessed because you have had faith in me although you have not seen me. For it is written of me that those who have seen me have no trust in me, but that those who have not seen me will believe and abide in me. Because you have shown your trust in me, preparations for your health will be made for you in every way. With respect to my coming to you, of which you wrote, I am obliged to fulfill these duties for which I was sent here by my Father, and, after doing so, to be taken up to my Father who sent me. But I am sending you one of my disciples who will cure you of your disease and give eternal life and peace to you and all of yours, and who will make your city safe so that none of your enemies may conquer it. Therefore I have written this letter in my own hand and sealed it with my seal."

In the papyri which the Colt expedition found during excavations at Auja Hafir, in southern Palestine, four other



theological writings have recently been identified, Prof. Casson said. A group of New York University classics department professors are working on the texts, which were all written in the seventh and eighth centuries A.D.

MEDICINE

New, Life-Saving Treatment For Bleeding Stomach Ulcers

Treatment Consists Simply in Giving Patient Plenty To Eat and Drink; Death Rate Drops From 9% to 3%

A NEW and revolutionary treatment for bleeding stomach ulcers, credited with saving as many lives as the sulfa drugs are saving from pneumonia deaths, was announced by Dr. T. Grier Miller, University of Pennsylvania School of Medicine, at the meeting in Boston of the American College of Physicians.

A drop in the death rate from 9% to 3% has been achieved, Dr. Miller said, without the development of a new drug, without discovering the cause of ulcer, and without the use of any special diet.

The treatment consists simply in promptly giving the patient plenty to eat and to drink, even if his ulcer is still

causing bleeding. This treatment is directly opposite to the usual starvation treatment in which the patient was given nothing by mouth so long as there was any bleeding.

The type of diet, so long as it is not irritating, is less important than prompt and adequate feeding of the patient, Dr. Miller said. Operation in the midst of hemorrhage is rarely, if ever, justified, he added.

"Far better results, both as regards the survival of the patient and his comfort, may be expected" from this new treatment, Dr. Miller declared.

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Treating tap water first with one, then with the other, of these "ion exchangers," leads to the production of a high quality "distilled" water, which compares favorably with, and in some cases exceeds, laboratory-distilled water in excellence," said Dr. Myers.

He cited other possible uses as follows:

"The resinous ion exchangers may be used in the softening of water for industrial, municipal and domestic use. They may be used in the partial or complete removal of salts from water, sugar solutions, protein solutions, biological and pharmaceutical media. They are of value in the recovery of traces of copper and other metals from dilute solutions, and in the removal of iron and objectionable acids from waters and industrial products. Other applications undoubtedly await the mere application of this new tool."

He pointed out that the zeolite process accomplishes some of these results in a similar way, but it cannot be used with solutions that are very acidic or alkaline. The resins work with either, and also with very hot solutions. The new process, he stated, was developed by the Department of Scientific and Industrial Research, of Great Britain.

Science News Letter, May 17, 1941

May Put Iron in Foods

INOSITOL, the anti-baldness vitamin (for mice—not men) could be used to make explosives, but chemists expressed the hope that it will be used for home defense on the nutrition front.

This sugar-like substance in the form of phytin combines with iron to make an almost pure white compound which "is being considered as a convenient form of adding iron in connection with the program of fortification of foods now being undertaken by the government," Dr. P. L. Pavcek and Dr. H. M. Baum, of the Biological Laboratory of Anheuser-Busch, Inc., reported.

Inositol is present in large amounts in corn where it is combined with phosphoric acid as phytin. Inositol, in the form of phytin, forms compounds with various metals, among which is iron. The fact that inositol forms explosive compounds with nitric acid has been known since 1850 but only in 1932 was it deemed important enough to serve as a basis of a patent.

Science News Letter, May 17, 1941

Homesickness attacks all races, and, so far as scientists have investigated, it is not affected by intelligence, education, or culture.

CHEMISTRY

Salt Water May Be Made Fresh By Treatment With Plastics

BY TREATING salt water with synthetic resins, closely similar to plastics used for radio cabinets, cigarette cases, and a host of other things, it can be made fresh. Ships at sea, and mid-ocean island air bases, may benefit by these products.

Speaking before the American Chemical Society in St. Louis, Dr. Robert J. Myers, of the Resinous Products and Chemical Company, described these new plastic uses. In his paper, prepared in collaboration with Drs. John W. Eastes, Harold C. Cheetham and Frederick J. Myers, he stated that this is the first use of plastics as chemical entities. Previous uses have been mainly concerned with their physical attributes, such as hardness, color, durability, etc.

When sodium chloride, ordinary salt, is dissolved in water, its atoms break up

into ions. There are chlorine ions, which have an electrical negative charge; and sodium ions, which carry positive charges. Most of the compounds dissolved in sea water, or the impurities in tap water, are similarly ionized.

In the molecular framework of which the resin consists are sodium atoms. When water, for example, which is hard because of the ions of calcium, magnesium and iron it contains, is passed over such a resin, the sodium atoms exchange places with the hardness-producing ions. After all the sodium atoms are used up from the plastic, it can be treated with a salt solution, which puts them back again.

It is also possible to prepare the synthetic resins so that they take out the sodium and other positive ions from the solution, putting hydrogen ions in.

PHYSIOLOGY

**Fellowship for Research
On Origin of Tumors**

A\$1,500 research fellowship has been granted to Dr. Frances Dorris Humm, research zoologist at Yale University, by Sigma Delta Epsilon, national organization of women in scientific research. Dr. Humm's researches, which are concerned with the origin and physiology of the pigment cell in chicks and rats, have bearing on the problem of pigmented tumors, among the worst of malignant growths. Work under the fellowship will be carried on at the laboratories in New Haven.

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PUBLIC HEALTH

**Medical Care System
Theme of New Novel**

WAR and national defense activities have pushed the problem of state or socialized medicine to the background of public attention. Most of us, unless recently faced with the bills for a serious illness, have stopped talking about how much it costs to be sick and how hard it is for many sick people to get adequate medical, nursing and hospital care. The whole huge problem of providing and paying for good medical care for all the population, however, has not yet been solved.

The breathing spell which national interest in defense activities has given to interest in the medical and health situation may prove salutary if it dispels or lessens the bitter feelings that have been aroused by discussions of health insurance, state medicine or socialized medicine. The breathing spell, however, would be far from healthful if it allowed interest in the situation to drop to the point where people generally failed to think about the problems involved and let themselves be unthinkingly swept by some emotional appeal into endorsing a defective or dangerous program of medical and health care for the nation.

A good antidote to the danger of thoughtlessness comes in a new novel, *That None Should Die*, by Frank G. Slaughter (Reviewed, *SNL*, this issue). The author is a young surgeon who has written an exciting story so well that he could be sure of a successful literary career if he ever abandoned his chosen profession of surgery.

The reader, besides being entertained by an absorbing story, will get a vivid and accurate picture of many phases of the doctor's and surgeon's work. He

will get a sympathetic but accurate picture of the good and bad features of the present system of medical practice and of the need for changes. Most important, he will get a striking object lesson of the horrible situation that could develop if medical and public health practice is not kept free of political control. Dr. Slaughter gives his own plan for a medical care system which avoids this danger, and his book should serve to awaken many to the danger and to its insidious nature.

Science News Letter, May 17, 1941

MEDICINE

**Patients Must Eat When
Taking Sulfanilamide**

PATIENTS must eat when they are taking sulfanilamide or one of its chemical relatives, Dr. John J. Shea, of Memphis, warned fellow ear, nose and throat specialists of the American College of Surgeons.

Taking sulfanilamide on an empty stomach is as bad as taking alcohol on an empty stomach, he explained. Without food, the medicine, like alcohol, can make a person dizzy and even "put him out."

Sulfanilamide, sulfathiazole and sulfapyridine are medicines but the surgeons welcomed them because they are saving many patients from operation. Many fewer mastoid operations, for example, have been performed since ear specialists have had these drugs to use for treating discharging ears which formerly required operation in many cases to save the patient's life.

In war surgery, sulfanilamide is destined to play a major role in clearing up the dangerous infections that almost always occur in battle wounds.

"The high point in the treatment of wounds today will be sulfanilamide, as the high point in the World War was the Carrel-Dakin solution," Dr. George P. Muller, of Philadelphia, declared in his address as retiring president.

Patients getting sulfanilamide treatment, however, must not only be fed. They must be put to bed and must be seen every day by their doctor, Dr. Shea warned. Blood tests should be made daily to guard against such high concentrations of the drug as might produce symptoms of poisoning. Some patients with discharging ears will have to be operated on for mastoid infection, in spite of sulfanilamide treatment, it was pointed out. Doctors must therefore continue to watch for symptoms of mastoid infection even if the patient's fever and ear-ache disappear under the treatment.

Science News Letter, May 17, 1941

IN SCIENCE

ANTHROPOLOGY

**Alaska Was America's
Original Melting Pot**

ALASKA was America's original melting-pot. Here one may trace the unity of the existing Eskimo population with the dark-skinned Asiatics who live on the other side of Bering Strait, and here can be found traces of an ancient people who resemble the Siouan Indians of the present-day western United States. Dr. Ales Hrdlicka of the U. S. National Museum told the American Association of Physical Anthropologists.

In prehistoric times there were seven distinct racial groups in Alaska, instead of only two as at present, Dr. Hrdlicka said. Each of the seven differed physically as much from the other six as the Eskimo and Indian populations of Alaska do today. Each also had its own distinctive culture.

Underlying the cultural differences there was a basic unity. This can only be expected, the veteran anthropologist explained, since the way of life had to be much the same. All seven of the vanished peoples were hunting and fishing folk, who lived mainly along the coast, so that they had similar problems to face and similar means for solving them. Even when they moved into the interior they remained essentially coastal, for they moved along the shores of great rivers.

Present-day Eskimos are not completely homogenous, so far as physical traits go, Dr. Hrdlicka continued. In physical measurement, and especially in size and shape of skull bones, the Eskimos of southwestern Alaska differ slightly but quite distinctly from those of the northern groups.

Science News Letter, May 17, 1941

INVENTION

**Can Converted to Pitcher
By Use of Plastic Spout**

ACAN of evaporated milk may be quickly converted into a convenient pitcher with a little plastic pouring spout. It is stuck into the top of the can, and may be left there until empty. It may be cleaned easily with hot water. (Canpour Mfg. Co.)

Science News Letter, May 17, 1941

SCIENCE FIELDS

AGRICULTURE

Oiling Silks on Corn Ears Keeps Out Earworms

IF YOU want to keep those nasty, messy earworms out of the patch of sweetcorn you have just now hopefully planted, carry on chemical warfare against them with mineral oil, advises the U. S. Department of Agriculture. The time for attack is when the ears are shaping up and the silk, having performed its function in pollination, is just beginning to wilt.

Plain mineral oil squirted into the silk at the ear-tip will get rid of earworms if they are still very small. If they have had time to get their growth started, the oil should be fortified with dichloroethyl ether, a chemical readily obtainable on the open market. A quarter of a teaspoonful to an ear is sufficient. It can be applied with an ordinary oilcan, for small gardens; force appliers with larger reservoirs are available for commercial growers. Since earworms travel quite readily every ear in the planting should be protected. This can be done easily in some of the newer hybrid varieties which mature their silks all at the same time; older sweetcorn varieties may require several trips through the patch to insure complete protection.

The oil-dichloroethyl-ether mixture, at a preferred strength of two per cent, works best in warm weather, when the temperature is above 60 degrees Fahrenheit. In cooler weather, a two-tenths per cent mixture of pyrethrin in oil is recommended.

Science News Letter, May 17, 1941

MEDICINE

Pledges Supply of Eyes From the Dead for Blind

A NOVEL organization, the Dawn Society, has just been formed in northern California of persons who pledge their eyes at death to give sight to the living blind.

As a result, it is hoped doctors will have enough cornea tissue from healthy eyes for people blind because of damaged corneas. This condition accounts for

about 5% of all types of blindness and is often due to industrial accidents.

Doctors have been successful in grafting corneas from one eye to another in recent years, but have been hampered by lack of healthy tissue for the operation. Oral promises to give their eyes to the blind, made by people before death, have not been helpful, as relatives will seldom agree to the operation when the willing donor is deceased.

Sponsored by the International Order of Good Templars, the Dawn Society now has forty members, each having signed a written, legally binding pledge to give his eyes to the blind immediately after death. The plan has the hearty approval and cooperation of the medical profession, and leading eye specialists in principal northern California cities will perform the post mortem operation on members. Both eyes will be removed within six hours after death, and stored in a light saline solution under refrigeration. The tissues will respond to grafting up to two weeks after being removed from the donor. So great will the demand be, however, that it will not be necessary to store the eyes more than a few hours or days.

Blind persons who want the sight-restoring operation will apply to their own physicians, and names of applicants will be listed and served in order of their receipt by the Dawn Society. The "gift eyes" may be sent to other cities, and may serve various people.

Science News Letter, May 17, 1941

ANTHROPOLOGY

Race Concept Meaningless Anthropologist Declares

THE concept of race, within the human species, is wholly meaningless, declared Dr. M. F. Ashley-Montagu of the Hahnemann Medical College and Hospital, Philadelphia. The bodily characters on which anthropologists rely in making their "racial" classifications are limited to a very few external characters involving a minute fraction of the hereditary units (genes) whose frequencies it would actually be necessary to consider in attempting to make any real, that is to say genetic, classification of mankind, Dr. Ashley-Montagu told the American Association of Physical Anthropologists.

He urged that whereas it is now demonstrable that the race concept "corresponds to nothing real, and is a very poor and meaningless fiction, it is urged that the term be altogether dropped from the scientific vocabulary of the anthropologist."

Science News Letter, May 17, 1941

ZOOLOGY

National Zoological Park Receives Three Penguins

See Front Cover

THREE Emperor penguins, giant birds standing four feet high, are among the new additions for the National Zoological Park brought up from Antarctica by Admiral Byrd's returning expedition. They were trans-shipped at Valparaiso, Chile, to the liner Aconcagua, which docked in New York. The birds finished their trip by rail.

Along with the three big penguins are four Gentoo penguins, one white giant fulmar and two kelp gulls.

Science News Letter, May 17, 1941

BOTANY

Try 'Tea-Thyme Tea' Is Botanist's Recommendation

TRY "tea-thyme tea," Prof. Ralph H. Cheney, Long Island University botanist, recommended to his audience at a New York Botanical Garden lecture. This beverage with a catchy name is made simply by adding a couple of crushed thyme leaves to China tea while it is being steeped. The result, with either hot or iced tea, will be a pleasant difference from ordinary tea taste, Prof. Cheney declared.

Twenty-two species of thyme are available for experimentation, he continued, but lemon thyme rates superior to all others in its ability to impart a lemon and spicy flavor to China tea.

The American public isn't getting all it might out of mint, either, in Prof. Cheney's opinion. Spearmint is well known for its use in juleps, he said, "but it is not the mint for the many refreshing non-alcoholic iced teas and fruit juices served during the summer." For these, he recommended applemint, lemon mint, curly mint, peppermint, pineapple mint and anise-flavored spearmint. Curly mint rates as most appropriate for blending with plain lemonade.

In his lecture, on American thirst-quenching plants, Prof. Cheney discussed more than fifty native plant sources for interesting and refreshing drinks. Some, like passion-fruit juice, are already making their way in the market. Others, like Scuppernong grape juice, have high merits which have never been properly publicized. A new combination, recommended by the New York Experiment Station at Geneva, N. Y., is "raspapple juice"—75 parts apple juice, 21 parts raspberry juice and four parts sugar.

Science News Letter, May 17, 1941

PHYSICS

Sounds in the Air

Theatrical Revolution Is Foreseen With New Techniques By Which Audiences Can Hear Voices Emanate From Space

By JAMES STOKLEY

COLUMNS of troops are heard marching down the aisle of a theater—even though that aisle is empty.

Or a line of tanks rumbles over the heads of the audience.

An airplane is heard approaching—it flies around the auditorium and crashes in the orchestra pit.

Angel voices seem to be all around, coming from no apparent source.

These are some of the newest of sound effects for theaters. They have been worked out experimentally by Harold Burris-Meyer, in the Stevens Institute of Technology at Hoboken, N. J. Perhaps, soon they will be used to give the opera a new degree of realism. Imagine having the Valkyries riding right over your head! In fact, the effects that can be achieved lead some to think that this may be the start of a new era, that may affect the movies, television and many other activities.

Mr. Burris-Meyer expressed his philosophy in an address before the Acoustical Society of America.

"We have a theory," he said, "that the whole auditory component of a show should have enough unity and dramatic significance to form a complete work of art even if divorced from the visual component. That doesn't mean a radio play. Most radio plays would be intolerable if anything were visible."

Greater Dramatic Power

"It does mean that speech, prop sounds, background music, all the sound in the show, if planned according to the principles of musical composition, can have many times the dramatic power that they now have. We have made a number of experiments to test the theory. They have been exciting. A production whose whole auditory component is composed as music has all the advantages of opera minus the heavy soprano or the limitations of the human voice or the musical instrument."

As a result of his experiments, he continued, "the limitations on the auditory component of the show are off. The players may speak with the tongues of men and of angels. With sound you can com-

pel the audience to laugh, to weep. You can knock them off their seats, you can lay them in the aisles, you can make them believe what you will. It has been done."

Variety of Equipment

Many kinds of equipment are used to obtain the effects. The actual sounds, of course, come from loud speakers, placed at various positions around the theater—some on the stage, others in the auditorium. In some productions, as many as 16 speakers have been employed, though never more than half at a time. There are electrical controls to energize various speakers, or groups of speakers, and to fade smoothly from one to another. There are the amplifiers, one of which must be provided for each channel in use, so that different sounds can be obtained. Eight are used in the complete installation. These can be adjusted to give the greatest fidelity, or, desirable in some cases, deliberately to introduce distortions for special effects.

There are the microphones of various types and characteristics, to pick up

sounds from living actors, or musicians. There are the devices for reproducing recorded sounds, some from disks, others from film, or from magnetized wires. And in addition there are other, novel, sound producing devices which feed into the electrical circuits.

The research program began in 1930, when recorded sound was being used as the background for a motion picture in a performance at the Stevens Theater.

It was found that the sound intensity affects the posture of the audience. They could be made to sit up straight, to move forward in the seat, relax, etc., merely by changing the loudness, almost irrespective of what they saw on the screen.

Powerful Tool for Artist

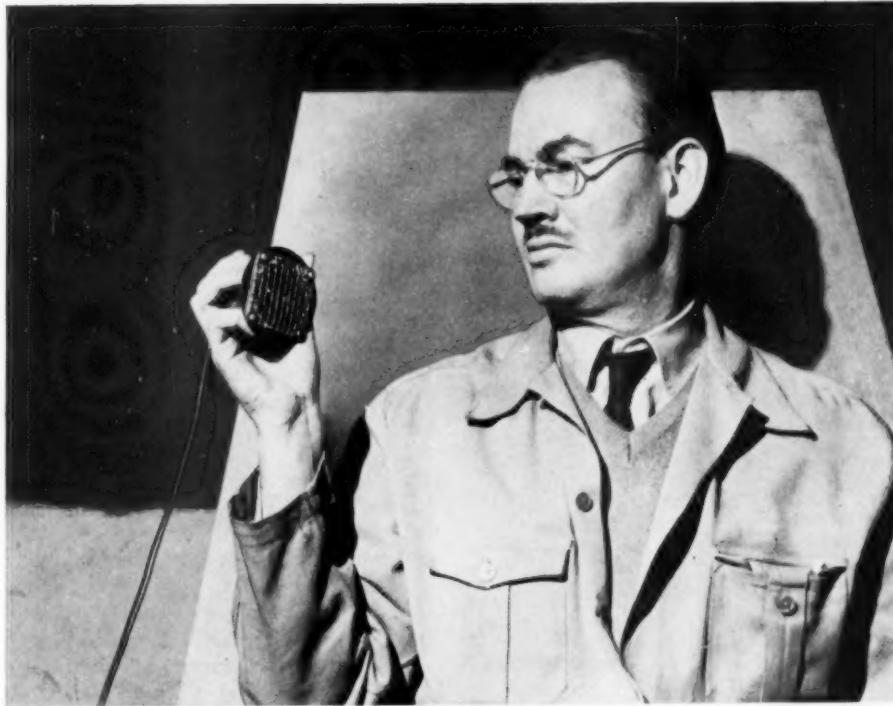
"With present-day audiences hardened by much theater-going," Mr. Burris-Meyer said, "an emotional response to a dramatic episode must be strong indeed if it is to be physiologically observable or measurable. Any device by which it is possible to achieve an obviously strong emotional response may constitute a powerful tool for the artist in the theater."

As a matter of fact, it was later found that an impression of great loudness can be produced even when the sounds them-



SOUND BLENDING

Carefully following the script the sound director plays on the switches as if on an organ console.



DIRECTOR

Harold Burris-Meyer, director of the Stevens Theater, with one of the small microphones used in connection with his sound control system.

selves do not reach extremely high intensity, by the simple expedient (simple, that is, if the building is not too solid) of shaking the building itself from a direction different from that in which the sound really comes from. A very loud sound does shake the building. Consequently, if you shake the building when a sound is made, it seems loud even if it isn't!

Then they experimented with changes in frequency, that is, pitch, or "shriileness" of the sounds. A celebrated effort was in a play by Elmer Rice, called "Adding Machine," in the "brainstorm" scene. Here is Mr. Burris-Meyer's description:

Expressionism in Sound

"We tried to achieve expressionism in sound, in conformity with the idiom of the play, and drive the audience crazy as the principal character lost his reason. We almost did. And the principal device was an almost pure tone warbled, and raised in frequency and intensity for about 32 seconds while the stage spun around and Mr. Zero turned killer. The 'Adding Machine' episode showed that you could use control of frequency very simply to achieve the dramatic objective of the playwright."

The other day, to show some of their latest achievements, the Stevens Theater presented its second "Sound Show," the first having been given seven years ago,

when the work was in its early stages. Leading figures in the theatrical and musical worlds crowded the modest auditorium.

The show consisted of excerpts from various plays, which brought out the effective use of the sound control. One was Shakespeare's "Tempest," a play most difficult to present if any effort is made to follow the directions.

The isle on which the action is laid, says Caliban in Act III:

" . . . is full of noises,

Sounds and sweet airs, that give delight, and hurt not.

Sometimes a thousand twangling instruments

Will hum about mine ears; and sometimes voices."

An important character is Ariel, the "airy spirit," who appears, generally invisible, and departs,

" to fly,

To swim, to dive into the fire, to ride On the curl'd clouds."

Surely the illusion suffers a severe jolt when, in such a part, appears a human being of flesh and blood, obviously just as corporeal as the other characters or any of the audience. Far different is he from Prospero's injunction:

" be subject

To no sight but thine and mine; invisible

To every eyeball else."

In the Stevens production, on the other hand, we saw what Shakespeare must have had in mind when he created the part. Prospero is on an apparently empty stage, conversing with Ariel, whose voice comes from the other side. And while his conversation continues, Ariel, as we might expect him to do, flits around the theater. His voice comes from the rear of the theater, from above—seemingly he is flying above the heads of the audience. And the music from his pipe and tabor moves about in the same way.

Ass Voice for Bottom

Another scene was from "Midsummer Night's Dream"—the one in which Titania, the fairy-queen, temporarily bewitched by her husband, Oberon, falls passionately in love with Bottom, who then has the head of an ass. Before and after this Bottom speaks with his own voice. Here the voice, though understandable, is that of an ass. But it still comes from his head, as he moves about.

This involves two techniques. First there is the remaking of the actual human voice by taking out certain frequencies, emphasizing others, to give it the quality one might expect to hear from the beast. There is the control of auditory perspective, the same as used for Ariel, to make the sound seem to come from any place desired. In the Tempest sequence, it was made to come from empty space, but in the Dream, it came from the place where Bottom happened to be.

A third Shakespeare scene was the opening one from "Macbeth," where the witches foretell Macbeth's career. The witches were unseen, though their shadows were visible. The voices were remade, to make them squeaky, to sound as a witch should.

Jungle Drums in Background

Scenes from Eugene O'Neill plays were on the program. In "Emperor Jones," the continual rhythm of the jungle drum in the background, gradually getting louder, is a most dramatic device. As presented by Mr. Burris-Meyer, it started in sub-sonics, a sound that could be felt, but not heard. This established the cadence before the sound was noticeable. In the final scene from O'Neill's "Lazarus Laughed," the laughter was formed by actual music modulated by the voice.

Reverberation is one of the most important qualities in which auditoria differ acoustically, and means have been worked out for controlling this. The Stevens Theater is the assembly hall of an old building, with very little of the qualities of a great cathedral. Yet in the



AT THE CONTROLS

Busy at the controls for the Stevens Institute of Technology's Second Sound Show are Julian Webster and Gunthers Zochfeld, in front. In the rear is Otto Niederer, head of the Sound Department.

church scene from Gounod's "Faust," where Mephistopheles calls Margarita, reverberation, with its relative, the echo, was introduced, especially in the case of the Mephistophelian voice.

Many individuals and groups have assisted, indeed, more than half of the cast of the second "Sound Show" was professional talent. Dr. Herbert Graf, stage director of the Metropolitan Opera Co., directed the Faust scene. Margaret Webster, director of many Shakespearean plays, particularly for Maurice Evans, has been working with him. The Rockefeller Foundation and the Research Corporation have both given grants to aid in the work.

When will these methods come into

WYOMING

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Write for illustrated folder with map

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ASTRONOMY—RADIO

Radio Waves May Show Shooting Stars in Daytime

WHEN a meteor, or shooting star, passes through the atmosphere many miles above the ground, it leaves behind it a radio mirror, a line of broken atoms, which may last for many minutes. By sending radio waves up, and measuring the time of the echo produced by their return, these meteor mirrors may be detected, Dr. J. A. Pierce, of the Crutt Laboratory of Harvard University, reports. (*Physical Review.*) In this way, he suggests, it may be possible to count meteors even in the daytime or in cloudy weather.

Dr. Pierce recently returned from South Africa, where he made observations of the radio effects of the total eclipse of the sun last autumn. While making control observations, with which to compare those of the eclipse day, the Leonid meteor shower occurred, on Nov. 14.

His studies were concerned with the ionosphere, the multi-storied layer of broken or ionized atoms that reflects radio waves to earth, and makes possible long distance wireless communication by carrying the signals around the earth's curvature. A moving film recorded the exact time that a special signal left the transmitter, and when it returned.

Early in the morning hours of the 14th, several bright meteors were seen. In several cases, after 16 or more seconds, a new reflecting area appeared, and lasted for a minute in one case, and 7 minutes in another. With the coming of dawn, about four o'clock, the sky was too bright to see any more meteors. However, 14 more traces, similar to those following the earlier ones, were recorded. Records made on other nights than those of the shower showed only a couple of very faint meteor traces.

Astronomers are greatly interested in checking the numbers of meteors entering the earth's atmosphere, but cloudy weather, and daylight, prevent the records from being complete. Possibly the radio method may be a solution to their problem for, states Dr. Pierce, "this method may be made sufficiently sensitive to compare with photographic registration of meteors, and that meteor counts can be made automatically without regard to time of day or weather conditions."

Science News Letter, May 17, 1941

A world-wide bibliography of 7,500 scientific articles written about *fossil vertebrates* between 1928 and 1933 has been published by the Geological Society of America.

PHYSICS

Mercury Possibly Turned To Gold In Atom-Smasher

No Use to Misers, However; It Is of a Form That Rapidly Vanishes and Only Minute Amount Obtained

MERCURY has apparently been turned into gold by the cyclotron, or atom-smasher, at Harvard University. This experiment, which may realize the ancient dream of the alchemists, was reported in Washington to the American Physical Society by Dr. Rubby Sherr and Prof. Kenneth T. Bainbridge.

However, the amount obtained was so exceedingly minute that only by an indirect method was its presence shown. Further, it is a form of gold that rapidly vanishes, even faster than ordinary gold in one's pocket! It decays like radium. With one form detected, after 48 minutes, half of a given amount is gone; after another 48 minutes, half of what remains, and so on. The other forms lasted a few days.

Dr. Sherr and Prof. Bainbridge shot heavy hydrogen nuclei, or deuterons, from the Harvard cyclotron, at lithium, from which high speed neutrons were obtained. These, in turn, were used to bombard mercury. A tiny amount of

gold was mixed with about a pound of the bombarded mercury. The mercury, being a liquid, was boiled away in a vacuum, leaving behind the gold, which is non-volatile. A chemical process removed small amounts of platinum which were also formed by transmutation of the mercury.

Tests of the gold showed several forms which acted like radium. One was the new kind, with half decaying in 48 minutes. Also were present forms that have previously been found by other means, with half-decay periods of 65 hours and 78 hours. However, since the gold itself had not been subjected to the neutron bombardment, and had not originally shown any radioactivity, it appears that these were formed in the mercury itself. Putting more gold with it, they all joined together, and could be more easily removed. In other words, the additional gold was the bait which drew the transmuted gold atoms to it, so that they could all be pulled out together.

Science News Letter, May 17, 1941

PSYCHOLOGY

Images Reproduced In Brain As In Television Receiver

Way in Which You Are Fooled by Optical Illusions Found to Conform to Laws of Electro-Magnetism

WHEN you look at a pretty girl or a house or a streamlined automobile, you are able to see them because of the electric impulses such forms send speeding to your brain. This is indicated by a report to the Eastern Psychological Association presented by William R. Sickles, of Columbia University.

Your eye works like a photoelectric cell, Mr. Sickles told the psychologists. Light differences reflected from an object produce electro-chemical differences in your eye's retina. This sends electrical impulses over the optic nerve to your brain.

In your brain, electric currents are created which reproduce the form seen by your eye in a way much like that in which pictures are reproduced on a television screen.

The electric nature of the visual process was demonstrated by Mr. Sickles from the way in which you can be fooled by optical illusions.

If you draw on a sheet of paper two lines meeting at a point, you can produce this sort of "fool-yourself." A car parked at a 40-degree angle to the curb would produce a similar outline. Now draw a line across the space between

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the lines near the point. Or lay a straight stick on the pavement diagonally between your car and the curb.

The laws of physics indicate that there is an electro-magnetic "pull" on your cross line which is proportional to the distance it lies from the point.

Next draw freehand another cross line parallel to your first one and a little farther from the point, trying to make it exactly the same length. When you measure it, you will probably find that it is actually longer than the one you tried to match.

A stick lying between the curb and the angle-parked car at the position of the rear door would have to be longer than one near the front wheel in order to appear the same length.

The extent to which such diverging lines distort your perception of the length of the enclosed vertical was found by Mr. Sickles to be governed by physical laws applying only to electro-magnetic fields. This, he concludes, is evidence that vision is an electro-magnetic phenomenon.

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Ink Blots Suitable For Army

ARMY recruits may, in the future, be asked to gaze at colored ink blots and tell what fanciful shapes or ideas the blots suggest to them, as a means of weeding out those men likely to break down under strains of war.

This possibility appears likely from a report to the Eastern Psychological Association by Dr. M. R. Harrower-Erickson and Dr. M. E. Steiner, of the Montreal Neurological Institute at McGill University.

The test was tried out by these investigators on a large group including college students, student nurses and a few patients from the Neurological Institute suspected of having brain tumor. Conditions of giving the test were suitable for large scale examination of recruits.

The odd ink blot shapes were thrown on a screen from a lantern slide. The group being tested looked at them and wrote in test booklets a description of what they saw on the screen as you might describe the fanciful creatures or scenes you might find in a summer cloud.

Answers differed widely, according to the personality of the individual. Here is what one college student saw in a blot often described as a bat or a moth:

"Three figures, two tough, worn bearded thieves cowering to Satan for comfort. Their clothing is in tatters, probably old furs, their elbows out. Satan's legs are cut off at the ankles, and are skinny. His ribs show through his cloak, he is bent toward the man whose head is most bowed."

This boy is considered by his college authorities as "eccentric, peculiar, Bohemian."

From the answers, the psychologists were able to pick out students having difficulty in getting along in their classes. They made correct diagnoses in every case of the patients from the Neurological Institute.

Science News Letter, May 17, 1941

Intensified Training Urged

AMERICA'S defense program demands more scientists who understand the human mind. An urgent appeal for intensified professional training for future psychologists able to deal with problems outside the schoolroom was presented to his colleagues by Dr. Walter S. Hunter, of Brown University, speaking as president of the Eastern Psychological Association.

Pressing social problems demand both scientific ability and general experience and wisdom, he declared.

"If a psychologist were given the problem of devising the best form of illumination for night driving which would at the same time favor the driver and handicap an airplane observer," Dr.

Hunter said, "the solution could only come from a careful study of the application of scientific knowledge to the particular conditions specified."

"If, on the other hand, the task were one of raising the general level of group morale, wisdom and experience would count for as much as scientific knowledge."

With the increased demand for social service, professional training should be made more rigorous, not relaxed, he indicated. Students of psychology should intensify their study of other sciences so that later they can work with physicians, chemists, or biologists on problems which involve these fields.

Specialization, as in medicine and engineering, should come only after a mastery of the fundamentals of the science.

Internships for psychologists who have their doctor's degree, like those for medical doctors, should be provided, Dr. Hunter said. Such opportunities for supervised practice of psychology are important for those who intend to work outside of research and teaching.

"There is a crying need," he declared, "for the establishment, by a few of the larger universities, of professional schools for psychology where men and women can be trained for non-academic work in industry, child clinics and mental hospitals."

Psychology undergraduate students at the better universities are already receiving the sort of broad scientific training urged by Dr. Hunter, he told his colleagues. Examination of students beginning their work for advanced degrees showed that those training in psychology have a better balanced undergraduate training than either physicists or chemists. They know more about biology than any other group except the biologists themselves.

Science News Letter, May 17, 1941

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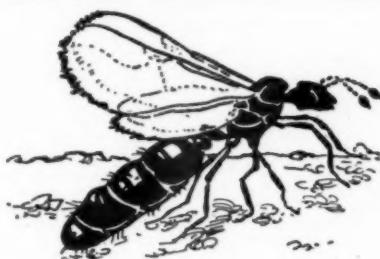
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Tertiary Termites

VAST swarms of mating termites flitted through sultry sub-tropical air in what is now the Rhine valley, 25 or 30 million years ago. They alighted on the leaves and twigs of laurel, fig, cinnamon, camphor and palm trees by a shallow, mud-bottomed lake. They shook off their wings, as termites do when preparing to settle down and found colonies.

The wings drifted in shimmering clouds out over the lake. With them drifted some of the insects themselves, injured, or weaker than the rest. Shed wings and dead insects sank to the silty bottom, became entombed, finally fossilized. Now they constitute one of the most striking records of ancient insect life to be found anywhere in the world.

The winged hecatomb on the silty bottom became layers of slate, with insect and plant remains pressed flat, but with details of structure beautifully preserved. It is possible to identify both plant and insect species with great exactness. Associated with the slate layers were larger masses of the plant remains, changed into brown coal or lignite.

A picture of the termite-infested forests of the Oligocene Rhineland is presented by a German paleontologist, Dr. Georg Statz. The particular lignite bed

which he studied lies in the hill country not far from Bonn, does not yield fuel suitable for use in stoves or under boilers, but it was once worked for the lamp oil that can be extracted from it, which was sold as "German petroleum." In 1866, however, competition of American kerosene killed the industry and the oil-lignite pits were abandoned.

Eleven species of fossil termites have been found in this one bed, out of a known total of 52. This site thus consti-

tutes one of the most important places in the world for research on the evolution of the termites.

By far the greater part of the mass of insect remains found in the slate-heaps are of primitive forms, especially one family now represented by only one species of living termites, found in Australia. Some of the specimens are quite large, as termites go, with body lengths between one-half and three-quarters of an inch.

Science News Letter, May 17, 1941

BIOPHYSICS

New Studies Add 'Vitreous' As Fourth State of Matter

ADD TO the three classic states of matter—solid, liquid, gaseous—a fourth state, the vitreous or glassy. This reclassification is desirable because of the wide differences between ordinary solids, which are crystalline in structure, and vitreous substances or glasses, which have no crystals in them, declares Prof. B. J. Luyet, St. Louis University biophysicist, joint author with Dr. P. M. Gehieno of a recent monograph, *Life and Death at Low Temperatures*. Crystalline solids are produced by relatively slow cooling of liquids; vitreous bodies by cooling too rapid to permit the formation of crystals.

The difference between crystalline solid and the non-crystalline glass becomes especially important in the reactions of living protoplasm when subjected to low temperatures. Freezing to death ordinarily occurs when cells are too slowly chilled to temperatures very little below the freezing point of water, permitting ice crystals to form in and about them. If they are chilled very suddenly, their watery contents become vitreous instead of turning to crystalline ice, and they may survive the experience without permanent injury.

Prof. Luyet and his associates have plunged thousands of single-celled organisms and thin tissue-layers into liquid air, and brought them to life again by warming them up rapidly. The materials of their experiments have ranged all the way from protozoa to the leaves of mosses. Moss leaves are especially suitable because each leaf is a single layer of cells; leaves of higher plants are many cell-layers thick, and are difficult to vitrify and to subject to "vitrofusion" rapidly enough.

The critical, crystal-forming temperature zone extends only a few degrees below the freezing point of water. Cells and tissues must be hurried through it, both going down and coming up; for a vitreous substance will become crystalline if the warming-up process is slow. The change, however, is irreversible; a crystalline solid cannot be turned directly into a vitreous substance.

It is practically impossible, Prof. Luyet states, to chill larger organisms, like frogs or goldfish, to extremely low temperatures without killing them. This is because their body heat cannot pass out through their relatively thick tissue fast enough to prevent that fatal crystallization just below the freezing point.

It is possible to give such animals a partial chilling, by exposing them only briefly to the extreme low temperatures. This permits their superficial tissues to freeze; as long, however, as the freezing does not reach their vital organs the animals can survive. But if a fish is frozen through and through, it is a dead fish, and will never wiggle again no matter how you warm it.

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ORGANIZING AND MEMORIZING, Studies in the Psychology of Learning and Teaching—George Katona—*Columbia Univ. Press*, 318 p., \$3.50. An important book of interest to teachers as well as psychologists and educational theorists.

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BIOPHYSICS

LIFE AND DEATH AT LOW TEMPERATURES—B. J. Luyet and P. M. Gehenio—*Biodynamica, Normandy, Mo.*, 341 p., \$4.50. First volume of a series of monographs on general physiology, edited by the senior author and to be published by *Biodynamica*. See also page 319.

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EDUCATION-PSYCHOLOGY

MENTAL HEALTH IN THE CLASSROOM (13th ed.)—Department of Supervisors and Directors of Instruction—*National Education Assoc.*, 304 p., \$2. A yearbook, the chapters of which are contributed by experts in various fields having to do with mental health in the schools.

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PSYCHOLOGY

ESCAPE FROM FEAR—Walter B. Pitkin—*Doubleday, Doran*, 264 p., \$2.50. This book by a well-known popular writer on psychology is intended to provide for the inhabitants of a war- and fear-sickened world an escape other than alcohol or mental disease.

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EDUCATION

VISUAL AND TEACHING AIDS FOR SAFETY EDUCATION, 6 p., 15c.; VISUAL AIDS IN THE REALM OF BIOLOGY, 21 p., 50c.—Lili Heimers, comp.—*Visual Aids Service, N. J. State Teachers College, Upper Montclair, N. J.* Two more of the helpful lists of charts, exhibits, films, pictures, slides and other material which teachers in high schools and junior colleges will welcome.

Science News Letter, May 17, 1941

MILITARY SCIENCE

WHAT THE CITIZEN SHOULD KNOW ABOUT THE ARMY—Harvey S. Ford—*Norton*, 230 p., \$2.

WHAT THE CITIZEN SHOULD KNOW ABOUT THE NAVY—Hanson W. Baldwin—*Norton*, 219 p., \$2.

WHAT THE CITIZEN SHOULD KNOW ABOUT THE COAST GUARD—Hickman Powell—*Norton*, 194 p., \$2.

A most notable group of books, telling briefly and clearly, but quite adequately,

the essential facts about the Nation's armed forces: organization, personnel, materiel, duties, tactics. The authors are all professionally qualified in their respective services, but they have the gift of popularization: they do not "write down" to the non-technical audience but make the reader master of the meanings behind the jargon, and even the slang, that soldiers, sailors, marines and guardsmen use. These three books should be on every citizen's reading table nowadays.

Science News Letter, May 17, 1941

ETHNOLOGY

KABLOONA—Gontran de Poncins in collaboration with Lewis Galantière—*Reynal and Hitchcock*, 339 p., illus., \$3. A French Kabloona (white man) takes you to the Canadian Arctic, to experience the strange life, and to meet the minds, of primitive Eskimos. Especially interesting are this French ethnographer's keen and persistent efforts to understand workings of Eskimo psychology. Here are not merely Eskimo people, but Eskimo personalities, described from diaries kept on the spot.

Science News Letter, May 17, 1941

NAVAL SCIENCE—AERONAUTICS

THE SHIPS AND AIRCRAFT OF THE UNITED STATES FLEET (Two-Ocean Fleet Edition)—James C. Fahey—*Ships and Aircraft*, 48 p., illus., 75c. New edition of a slim but fact- and picture-packed booklet of information on ships and aircraft of the Fleet. An exceedingly useful and interesting publication to have handy, these days.

Science News Letter, May 17, 1941

EXPLORATION

THE TRUTH ABOUT LEIF ERICSSON AND THE GREENLAND VOYAGES—William B. Goodwin—*Meador Pub. Co.*, 445 p., illus., \$3.50. Under this bold title, the author sets forth his conclusions about a controversy that has been solved often. Mr. Goodwin uses the method of fitting old maps and saga descriptions to American terrain to locate lost Viking settlements, and concludes that Norumbega, translated as New Norway, lay between Cape Cod and the Hudson River.

Science News Letter, May 17, 1941

ORNITHOLOGY

ORNITHOLOGY LABORATORY NOTEBOOK (4th ed.)—Arthur A. Allen—*Comstock*, 204 p., illus., \$3.

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PSYCHOLOGY

HUMAN NATURE IN THE LIGHT OF PSYCHOPATHOLOGY—Kurt Goldstein—*Harvard Univ. Press*, 258 p., \$2.50. At the time of the World War, the author was in charge of a hospital for brain injured patients. There, for years, he could observe the behavior and mental and personality abnormalities of otherwise healthy young men whose brains had been damaged. Through close observation of such deviations from the normal, he is able to furnish a new and clear insight into normal behavior.

Science News Letter, May 17, 1941

PSYCHOLOGY

MODERN MARRIAGE, A HANDBOOK FOR MEN (2d. ed.)—Paul Poponoe—*Macmillan*, 299 p., \$2.50. The general director of the American Institute of Family Relations, from long observation of troubled marriages, writes this useful handbook for men contemplating marriage. Written humorously, it nevertheless contains much sober and sound advice.

Science News Letter, May 17, 1941

MEDICINE—FICTION

THAT NONE SHOULD DIE—Frank G. Slaughter—*Doubleday, Doran*, 423 p., \$2.75. See page 312.

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POPULATION

THE IMMIGRANT IN AMERICAN HISTORY—Marcus Lee Hansen—*Harvard Univ. Press*, 229 p., \$2.50. The romantic story of the many waves of migrants who have from time to time contributed to the melting-pot that is America.

Science News Letter, May 17, 1941

JOURNALISM

THE MANUSCRIPT, A Guide for Its Preparation (3d. ed.)—*Wiley*, 74 p., illus., \$1. Things that an author would want to know about preparation of copy, planning of illustrations, proofreading, indexing, postage and even copyrighting.

Science News Letter, May 17, 1941

ECONOMICS

OCCUPATIONAL TRENDS IN THE UNITED STATES—H. Dewey Anderson and Percy E. Davidson—*Stanford Univ. Press*, 618 p., \$6.50. This volume brings together for the first time in usable form the reports for the occupational classes of the seven volumes of the Census of Occupations published from 1870 to 1930 with estimates for 1940.

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